

AIR RESOURCES BRANCH
TECHNOLOGY DEVELOPMENT AND APPRAISAL SECTION
MONITORING AND INSTRUMENTATION DEVELOPMENT UNIT

ARB-TDA Report No. 40-77

Report on PCBs Monitoring in Mississauga

(St. Lawrence Cement Plant)

[February - March, 1977]

Ministry of the Environment
Air Resources Branch,
880 Bay Street,
TORONTO, Ontario.

July, 1977

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0.1 Summary

The concentrations of PCBs in ambient air in Mississauga before and during the incineration of PCBs contaminated oil in the St. Lawrence Cement Plant under meteorological conditions prevailing at the time of monitoring were well within the range found in other residential districts of Ontario.

High concentration of PCBs were monitored on the St. Lawrence Cement Plant property in the immediate vicinity of the PCBs contaminated oil storage area and pumping station.

02 Recommendations

Because of variable and sometimes very high PCBs concentration in the oil (up to 25%) and problems with pumping of contaminated oil into the storage tank, such as frozen or plugged lines, leaking pumps, blown gaskets with resulting oil spill and increased levels of PCBs (up to 2000 ng/m³) downwind of the storage area, we recommend the following actions, should the PCBs contaminated oil be incinerated in the St. Lawrence Cement Plant on regular basis.

- 1. The storage and pumping of PCBs contaminated oil should be significantly improved. No PCBs should be allowed to escape into the environment during unloading, pumping, storage and emergencies.
- 2. A procedure to decontaminate spilled oil and trucks delivering oil should be established and approved by the Region. Any spill should be reported to the Region.
- 3. Before oil transportation to the St. Lawrence Cement plant, the PCBs concentration in oil should be established and reported to the Region and on receiving samples taken for further analysis.
- 4. Three PCBs monitoring stations should be established in the vicinity of the oil storage area on the St. Lawrence Cement Plant property. These stations shall be operated by the company and results reported to the Region.
- 5. Three monitoring stations should be established at the St. Lawrence Cement Plant property line in the immediate vicinity of the contaminated oil storage area.
- 6. Four PCBs monitoring stations should be established in the area of Mississauga in the distance of 2 to 4 km from the stack. At least two should be in the direction of prevailing winds and one upwind which would serve for monitoring of background levels.

7. If the PCBs contaminated oil is not incinerated any longer at the St. Lawrence Cement Plant, all the equipment used for handling the oil and area where it is located, should be decontaminated and checked for any residual contamination. The decontamination procedure should be approved by the region and results of decontamination should be reported to the Region.

03 Introduction

The survey of PCBs in ambient air in the vicinity of the St. Lawrence Cement Plant in Mississauga was done at the request of the Central Region in close co-operation with Mr. D. J. Ogner - Air Quality Assessment and Laboratory Services Branch of the Ministry of the Environment.

The survey was divided into two parts. In the first one in February 1977, an attempt was made to establish the background levels of PCBs in the area under prevailing meteorological conditions. In the second one, in March, 1977, which proceeded during incineration of PCBs contaminated oil in the plant, an attempt was made to establish any change in the ambient air concentration of PCBs under prevailing meteorological conditions.

04 Source Description

The main source of PCBs was considered the stack of the St. Lawrence Cement Plant. For the source description, see report of Fisheries and Environment of Canada, Environmental Protection Service - Report EPS 4-WP-77-2.

Because the "Tricil" industrial incinerator operating in the vicinity of St. Lawrence Cement Plant may have been a source of chlorinated hydrocarbons which may have interfered with the monitoring of the St. Lawrence Cement Plant, samples of the incinerated waste were taken during the operation and analysed for possible presence of chlorinated hydrocarbons.

05 Monitoring Method

Five permanent monitoring stations were established in Mississauga and the vicinity of the St. Lawrence Cement Plant. The sixth station was mobile and was mounted on the roof of the mobile air monitoring unit which was located downwind of the source, whenever it was possible.

The four permanent monitoring stations located in residential districts of Mississauga and in the Lakeshore Sewage Treatment Plant collected air samples over an approximately 24 hour period every day of the survey.

The fifth permanent monitoring station, located in the vicinity of the oil storage area collected a special set of samples during the pumping of the oil from the tanker-trucks into the storage tank. Otherwise it also operated on 24-hour schedule.

The mobile station operated only over the period the mobile air monitoring unit was downwind of the source.

06 Analytical Technique

Sample Collection

PCBs from air were collected in a glass cartridge with a bed of Florisil 60/80 mesh - the bed diameter was approximately 12 mm, height approximately 50 mm. Air was drawn through the cartridge by a sampling train, (NUTECH CORPORATION) consisting of a flow-controller, air pump, dry gas meter, flowmeter and pressure gauge. The flow-rate was adjusted as close to 10 litre/min. as it was possible.

The sampled air volume was read from the dry gas meter and adjusted to 25°C and 760 mm Hg.

Analytical Procedure

The cartridges were filled with "Florisil" at the Laboratory Services Branch - Organic Trace Contaminants Sec - and tested for possible contamination before they were sent sealed to the field. Sealed exposed cartridges, after being collected, were immediately delivered to the Laboratory Services Branch - Organic Trace Contaminants Sec. for analysis.

Liquid Samples

A sample was taken from each PCB-contaminated oil delivery to the St. Lawrence Cement Plant and delivered to the Laboratory Services Branch - Organic Trace Contaminates for analysis. Three samples were collected and analysed.

Fourteen samples of waste were collected by Mr. R. Graham from the Central Region from the "Tricil Ltd." industrial incinerator and sent to the Laboratory Services Branch for analysis.

07 Meteorological Conditions

Meteorological conditions as wind speed, wind direction and temperature were monitored during the survey by a mechanical weather station located at the Lakeshore Sewage Treatment Plant. Summary of the meteorological conditions is in Table 1.

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08 Sampling Site Location

Sampling Site

No.

- 1 469 Apple Lane Dr. Sampler located in the backyard at street level.
- 2 Clarkson Public School, sampler located approximately 30 feet above the street level.
- 3 St. Lawrence Cement Plant, sampler located in the oil storage area 3 feet above street level, approximately 50 feet downwind from the pumping station.
- 4 Lakeshore Sewage Treatment Plant, Sampler located at the street level in the N/E part of the plant.
- 5 2475 Truscott Dr. Sampler located on the roof of the Senior Citizen Home
- 6 Mobile air monitoring unit, Sampler located on the roof of the vehicle, approximately 15 feet above the street level, usually downwind of the St. Lawrence Cement Plant.

For exact Sampling Site location, see the attached map of Mississauga.



09 Results of the Survey

The results of the PCBs concentration in ambient air are summarized in Tables 2 and 3. All results are reported in ng/m^3 .

Concentration of PCBs in oil are reported in Table 4.

TABLE 4

PCB in oil (St. Lawrence Cement Plant)

Date of Delivery	Origin	PCB Concentration
February 21/77	U.S.A.	25%
February 24/77	Ontario Hydro	116 ppm
February 25/77	U.S.A.	0.39%

The results of PCBs in waste samples from the Tricil industrial incinerator were not yet received.

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10 Discussion

The PCBs concentrations in ambient air in residential districts of Mississauga ($0.1 - 4.5 \text{ ng/m}^3$) are well within the range found in other areas of Ontario, (See Tables 2 and 3). Under the meteorological conditions prevailing during the incineration of the PCBs contaminated oil, no significant increase in the PCBs level was found.

High PCBs concentrations (up to 2000 ng/m^3), were monitored in the immediate vicinity of the PCBs contaminated oil storage area. This result suggests the storage may be contaminated (spills).

Immediate action should be considered

- a) To test all the equipment and area for PCBs contamination, and decontamination should be considered if burning of PCBs contaminated oil is to be discontinued. ←
- b) A reconstruction of the storage area and pumping station should be considered if the PCBs contaminated oil will be incinerated in the plant on a regular basis. The reconstruction should prevent any escape of PCBs into the environment during unloading, storage and pumping. ←

Because the oil, brought for incineration may contain up to 25% PCBs, a procedure for safe handling of tankers with this load should be established. <

Should the PCBs contaminated oil be incinerated in the St. Lawrence Cement Plant on a regular basis, a network of monitoring stations in Mississauga should be established with special concern to the storage area, pumping station and unloading of tanker-trucks.

TABLE 2

Summary of PCBs Levels in the Mississauga
Area

*Periods when Oil Tankers were filling Storage Tanks		Location No. and Concentration of PCBs [ng/m3]					
Date 1977	Sampling Time	1	2	3	4	5	6
Feb 21	17 hrs. 45 min			62.0*			
	22 hrs. 30 min				1.0		
	22 hrs 10 min					0.81	
	24 hrs 15 min		1.1				
	23 hrs. 20 min	1.1					
Feb 22	25 hrs. 10 min			60.5			
	25 hrs. 5 min				1.8		
	24 hrs. 30 min		.90				
	24 hrs. 30 min	2.3					
	25 hrs. 50 min					.70	
Feb 23	21 " 15 "					1.8	
	22 " 40 "	2.5					
	23 "		3.7				
	24" 40 "				2.5		
	26 "			2.7			
Feb 24	2 " 35 "			202*			
	23 " 5 "		0.62				
	23 " 15 "				0.90		
	3 "						1.
	24 " 40 "	0.77					
	25 " 45 "					0.70	
	23 " 10 "			106			

Table 2 Cont'd/... 2

Summary of PCB's Levels in the Mississauga Area

*Periods when Oil Tankers were filling Storage Tanks		Location No. and Concentration of PCBs [ng/m3]					
Date 1977	Sampling Time	1	2	3	4	5	6
Feb 25	1 hr. 30 min.			232*			2.3
	22 hrs.					0.8	
	25 hrs. 25 min.		1.1				
	23 hrs. 20 min.	1.4					
	24 hrs. 30 min				1.4		
	24 hrs.			2.6			
Feb 28	1 " 20 "			168*			2.1
	24 " 30 "						
	22 " 15 "			99.5			
	1 "			586*			
	26 " 55 "				1.5		
	28 "		1.7				
	28 " 15 "	1.2					

TABLE 3

Summary of PCBs Levels in the Mississauga
Area

LOCATION NO. & CONCENTRATION OF PCBs [ng / m3.]							
Date 1977	Sampling Time	1	2	3	4	5	6
March 21	24 hrs. 52 min.	2.8					
	24 hrs. 25 min.		3.2				
	23 hrs. 7 min.			74.1			
	22 hrs. 49 min.				3.9		
	23 hrs. 8 min.					1.7	
March 22	22 hrs. 54 min.						
	22 " 48 "		2.0				
	*24 " 32 "			670			
	24 " 24 "				1.1		
	23 " 37 "					2.0	
							5.6
March 23	24 " 17 "	0.3					
	24 " 25 "		1.4				
	24 " .			947			
	23 " 57 "				1.60		
	24 " 35 "					0.08	
March 24	25 " 38 "	1.6					
	25 " 28 "		2.3				
	24 " 48 "			504			
	24 " 23 "				1.2		
	24 " 16 "					0.2	

Table 3 cont'd/... 2

Summary of PCBs Levels in the Mississauga Area

Date 1977	Sampling Time	1	2	3	4	5	6
March 25	22 hrs. 38 min.	0.2					
	22 " 45 "		0.5				
	22 " 33 "			583			
	22 " 34 "				0.5		
	22 " 45 "					0.1	
							2.1 4.0
March 28	26 " 40 "	1.2					
	26 " 36 "		3.5				
	26 " 38 "			353			
	26 " 32 "				4.5		
	26 " 15 "					3.0	
March 29	20 " 42 "	3.0					
	19 " 52 "		3.0				
	19 " 55 "			2300.			
	20 " 27 "						

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